

THE SOUTH AFRICAN SPECIES OF AGAMA.*

By LEWIS HENRY GOUGH, Ph.D.

Eight species of *Agama* were quoted by Mr. Selater in his "List of the Reptiles and Batrachians of South Africa" (Ann. S.A. Mus., Vol. I, pp. 95-111, 1899) as occurring in this sub-Continent, viz. :—*Agama hispida* (Linn), *Agama brachyura* Blgr., *Agama aculeata* Merr., *Agama armata* Peters, *Agama atra* Daud, *Agama planiceps* Peters, *Agama microterolepis* Blgr.

The following additions or alterations to the list were then, or have subsequently become, necessary :—

Agama pulchella Bocage, 1896, from Modder River, O.R.C.

Agama holubi Bocage, 1896, from Modder River, O.R.C.

(*Agama micropholis*, Matschie, 1890, Transvaal).

Agama distanti, Blgr., 1902, Transvaal.

However, *Agama micropholis* has been reduced to a synonym of *Agama atra* by Tornier (Zool. Jahrb. Syst. XV, p. 673, 1902), and Boulenger has placed *Agama microterolepis* also in the synonymy of the same species (P.Z.S., 1905, 11 (7), p. 253). *Agama brachyura* has been redescribed by Boulenger (loc. cit., p. 252).

The revised list would now read :—*Agama hispida*, *Agama brachyura*, *Agama aculeata*, *Agama armata*, *Agama atra*, *Agama planiceps*, *Agama atricollis*, *Agama pulchella*, *Agama holubi*, *Agama distanti*.

During the working out of the lizards of the collections of the Transvaal Museum and of the Albany Museum, it became necessary to go into this group more carefully, and it was found that six of the ten species were represented in the collections. As the literature on the subject is rather scattered, and as they form a most difficult group, I am here giving the descriptions of each species, with notes on the specimens at my disposal, and a key for their identification. I have included in the key *Agama kirki*, *Agama mossambica*, *Agama anchietae*, and *Agama colonorum*, as being likely to occur in the northern portion of the sub-Continent, and have also given their descriptions at length.

None of the South African species have a regular gular pouch, but all have a more or less distinct gular fold ; in some species the skin of the throat is somewhat plicate.

The species under consideration can be divided roughly into two groups, species with heterogenous scaling on the back, and species with homogenous scaling. This grouping seems to be faulty when applied to *Agama atra* Daud, some specimens appearing to have almost homogenous scaling, others to have heterogenous. However, closer examination will usually, if not always, reveal the scaling to belong to the latter description. In the key, this species is made to come out under both headings, in order to facilitate identification. The relative length of hind leg to body, i.e. how far it extends when adpressed, as also the relative length of the tail, varies in some species very considerably according to sex ; the tail

* Paper read at the Grahamstown meeting of the S.A.A.A.S., July, 1908.

and limbs are in proportions shorter in females than in males, thus giving the females a habitus quite different to that of the males. The females usually appear fatter and more flattened. The sexes are otherwise easily recognised by the presence of one or two rows of praeanal pores in the males; the females have no such structures.

DESCRIPTIONS OF SPECIES.

A. DORSAL SCALES EQUAL, NOT INTERMIXED WITH ENLARGED SCALES.

1. AGAMA PLANICEPS. *PETERS*.

Dorsal scales smooth and not mucronate in the adults, roundish, imbricate, moderate sized, not mixed with enlarged scales. (Sometimes more or less strongly keeled, according to Boulenger; also see note by Bocage *Herp. Angola*, p. 19.)

Upper head scales smooth or feebly keeled; occipital enlarged hexagonal or octagonal. (One or two elongate narrow scales on the middle of the snout are mentioned by Bocage, but not shown in his figure; not mentioned by Boulenger.)

Spines short, in groups on the sides of the head near the ear, and on the neck.

Nostrils tubular, directed upwards and backwards on the canthus rostralis. Crests: A slight nuchal, no dorsal, tail keeled above in male.

Scales on the limbs (judging by Bocage's illustration) larger than the dorsals, keeled, not mixed with enlarged spines.

Ventrals much smaller than the dorsals, smooth.

Rows of scales round the body, 64-86.

Fingers: Third and fourth equal.

Toes: Fourth slightly longer than third, fifth extending beyond first.

Colouration: Olive brown above, with small yellow spots, head and tail paler, below uniformly yellow.

Habits: Bocage states that Anchieta found them in cracks and cavities of rocks, usually near human habitations.

Remarks: I have no specimens which I could identify with this species. I have had to combine the description from Boulenger *Cat. Liz* 1, p. 358, and Bocage *Herp. Angola*, p. 18-19. Peters' original description was not accessible. I must, however, point out some discrepancies in the writings of the two authors cited: Boulenger does not remark the elongate narrow scales on the snout, neither does Bocage show them in his figure. Bocage finds the ear-opening as large as the eye-opening, Boulenger records it as much larger than the eye-opening. Bocage states the fourth finger to be a little longer than the third, Boulenger calls them equal.

2. AGAMA COLONORUM. *DAUD*.

Dorsal scales flat, rhomboidal, strongly keeled, mucronate, imbricate, rather large, the keels form straight lines converging towards the median line.

Upper head scales smooth or feebly keeled. Occipital enlarged, surrounded by a few somewhat enlarged scales. An elongate, narrow, keeled scale on the middle of the snout.

Spines on the head: A few very short spines on the sides of the head near the ear and on the neck.

Nostril tubular, directed upwards and backwards, on the canthus rostralis. Crests : A slight nuchal, no dorsal, tail keeled above in the males.

Scales on the limbs, similar to the dorsals.

Ventral scales smooth or feebly keeled, smaller than the dorsals.

Scales around the body, 60-80 (Blgr.)

Fingers : Third and fourth sub-equal, fifth extending beyond first.

Toes : Fourth longest, fifth extending considerably beyond first.

Anal pores in a single row.

Colouration : Dark brown (or olive) above, yellowish grey below ; under side of throat marbled or reticulated with darker.

Remarks : The above description was taken from specimens in the Albany Museum, obtained from Kamerun. *A. colonorum* and *A. planiceps* would seem, judging from Bocage's remarks (loc. cit. p. 19) to merge gradually into each other, and ought perhaps only to be considered as the extreme forms of one species.

3. AGAMA KIRKI. BOULENGER.

Dorsal scales strongly keeled, not or very slightly mucronate, imbricate, rhomboidal, small. The keels converge toward the median line.

Upper head scales smooth or feebly keeled, occipital enlarged.

Groups of very small spines on the sides of the head near the ear and on the neck.

Nostril tubular, directed upwards, on the canthus rostralis.

Crests low, but very distinct, nuchal and dorsal, tail keeled above.

Scales on the limbs similar to the dorsals, but larger, not intermixed with enlarged spinose scales. (Judging by the figure, pl. 28, fig. 2, B.M. Cat.)

Ventral scales smooth, scarcely larger than the dorsals.

Scales around the body 99.

Fingers : Fourth longer than third.

Toes : Fourth a little longer than third, fifth extending beyond first.

Tail compressed and keeled above, covered with strongly keeled scales, forming rather distinct annuli.

Anal pores in a single row.

Colouration : Olive above, with dark net work enclosing light ocelli, collarpit black, lower surfaces whitish, with indistinct darker lines.

Remarks : The above description is taken from Boulenger, Cat. Liz., Vol. I., p. 354, no specimen being at my disposal. As the type was obtained by the Zambesi Expedition, it is to be expected that this species may be rediscovered in the northern portion of the sub-Continent.

4. AGAMA MOSSAMBICA. PETERS.

Dorsal scales strongly keeled, mucronate, rhomboidal, the keels converging towards the median line.

Head scales more or less strongly keeled, some being pyramidal, occipital enlarged.

Groups of short spinose scales on the sides of the head near ear-opening and on the neck, sometimes wanting on the margin of the ear.

Nostril tubular, directed upwards and backwards, on the canthus rostralis.

Crests : A nuchal, and a dorsal crest, the latter sometimes partially obliterated.

Ventral scales keeled and mucronate (Fischer).

Rows around the middle of the body 77-81.

Fingers : Third and fourth nearly equal.

Toes : Third as long as or slightly shorter than the fourth, fifth extending beyond the first.

Tail slightly compressed, scales strongly keeled.

Colouration : Olive or brown above, with a row of more or less distinct large brown spots on each side of the vertebral line, or a single row of large spots ; lower surfaces lighter, throat dotted blackish.

Remarks : This species may be found to occur in the northern portion of the sub-Continent ; the description has been taken from Boulenger (loc. cit. p. 353) and Fischer (Jahresb. Naturh. Mus. Hamb. f. 1883).

B. DORSAL SCALES INTERMIXED WITH ENLARGED SPINOSE SCALES.

5. AGAMA ATRICOLLIS. SMITH.

Plates XVII and XVIII.

Dorsal scales small, keeled, mostly mucronate, larger on the median line, intermixed with enlarged, strongly keeled and pointed scales, with a strong tendency to form straight, vertical and transverse lines. A curved fold on each side of the body is marked by slightly enlarged, pointed scales.

Upper head scales smooth or feebly keeled ; occipital not enlarged, usually smaller than the surrounding scales. A few conical scales on the snout.

Spines on the sides of the head small, scattered or in short rows of two or three, chiefly on the cheeks, which are very swollen in adult males, less so in females. The cheeks sometimes almost hide the ear. A few enlarged conical scales usually margin the ear.

Nostril somewhat tubular, pierced just below the canthus rostralis, or just touching it with the upper edge.

Crests : The nuchal crest is marked by a series of enlarged keeled pointed scales, sometimes extending on to the anterior portion of the back.

Scales on the limbs, strongly keeled and mucronate, the keels combining to form regular curved lines, size on the average larger than the dorsals, usually irregular.

Ventral scales smooth.

Tail covered with strongly keeled scales, largest above forming rather regular annuli. In some specimens every three or four rows of scales seen from the side, form an annulus, by reason of the rows increasing in size from 1-3 or 4 ; in these cases one or two rows of scales on the upper surface often correspond to 3 or 4 on the sides.

Fingers : Third and fourth almost equal, fifth extending well beyond first.

Toes : Fourth very slightly longest, fifth considerably longer than first.

Anal pores in two rows.

Colouration in spirits olive or brown above, yellowish beneath, sometimes reticulated with black. The enlarged scales of the back often lighter.

Young specimens often grey with black X shaped markings above, and black annuli on the tail. In life, the adults are very different objects, their colours being much brighter, and capable of being changed at the will of the animal. When excited, the males have bright blue or green heads, backs and ventral surfaces. Females and young do not appear to show the green or blue tints to the same extent.

Habits : I have found this species invariably upon trees ; it seems to take to the ground very unwillingly. When it finds itself observed, it slips over to the far side of the branch or to the other side of the trunk of the tree, much like the European squirrel. Usually a single male and a single female are observed together. When chased or captured, they offer fight very readily. The natives believe them to be poisonous.

Records :

- 1-5 Transvaal.
- 6-8 Waterval Onder, Nov., 1907, Gough (*Plate XVII*).
- 9-10 Lydenburg, Kranz.
- 11 Wonderboom, near Pretoria, Oct., 1906, Noome (figured).
- 12 No records.
- 13 Barberton, March, 1908, Williams.
- 14 No records.
- 15-16 Woodbush, Zoutpansberg District, Dec., 1908, Gough.
- 17-18-19 Kaapmuiden, Sept., 1907, Bolton (*Plate XVIII*).
- 20 Woodbush, Dec., 1907, Gough.
- 21 Wonderboom, Dec., 1906, Noome.
- 22 Louws Creek, Sept., 1907, Gough.
- 23-24-25-26 Waterval Onder, Sept., 1907, Gough.
- 27-28 Barberton District, Jan., 1908.
- 29 Komatipoort, 1906, Ryan.

These records show that the species is found chiefly in central and the eastern Transvaal in the low and middle veld.

6. AGAMA ANCHIETAI. *BOCAGE*.

Dorsal scales keeled and mucronate, the median rows largest, disposed in longitudinal rows. The scales of the sides of the back intermixed with groups of, or single, enlarged more strongly mucronate scales, not forming longitudinal series.

Head scales mostly keeled, occipital enlarged.

Groups of short spines on the sides of the head and neck, no spines on either anterior or inferior margin of the ear.

Nostril tubular (situated ?).

Crests : A distinct nuchal crest, the dorsal crest replaced by the keels of the median row.

Ventrals smaller than the dorsals, more or less keeled.

Fingers : Third slightly longer than the fourth.

Toes : Third slightly longer than the fourth, fifth extending as far as the first.

Tail twice as long as the body, caudal scales larger than the dorsals, keeled and mucronate.

Colouration variable, uniform pale olive brown or more or less bright yellow, with transverse black bands, interrupted in the median line by a spot of the ground colour.

Remarks : The description of this species, which has not yet been found in South Africa is taken from Bocage *Jorn de Sci., Math., 1896, No. XV, p. 129.*

7. AGAMA BRACHYURA. *BOULENGER.**Plate XIX*, figs. 1, 2.

Dorsal scales irregular, strongly imbricate, keeled, intermixed with strongly enlarged, keeled, mucronate spinose scales, with a tendency to form regular longitudinal rows.

Head scales more or less keeled, on the middle of the snout enlarged, trihedral; some trihedral scales around the enlarged occipital scale on the upper surface of the head are more or less spinose.

Groups of spinose scales on the sides of the head, around ear, and on the neck.

Nostril not tubular, pierced just below the canthus rostralis.

Crests distinct on neck and on body (sometimes wanting on body [Blgr.]).

Ventrals smooth or very feebly keeled.

Fingers: Third longest, fifth extending beyond first.

Toes: Third and fourth sub-equal, fifth not extending as far as the first.

Tail covered with strongly imbricate, keeled scales, larger than the dorsals; some enlarged scales at the base.

Limbs covered with unequal, strongly keeled scales, mostly larger than the dorsals.

Anal pores in one row.

Colouration: Dark brown above, with a row of black spots on each side of the vertebral line, tail annulate, under surfaces grey, with very wide blackish reticulations.

Records: One male, locality (?); Taylor (*Plate XIX*, figs. 1, 2).

8. AGAMA HISPIDA. (*LINN.*)*Plate XX*, figs. 3, 4.

Dorsal scales moderate, strongly keeled and mucronate, intermixed with strongly enlarged spinose scales, forming more or less regular longitudinal rows.

Head scales rough, keeled, or sub-conical; occipital enlarged, nearly surrounded by conical spinose scales. A few enlarged sub-conical scales on the middle of the snout.

Spines on upper surface of the back of the head and on the sides of the head near the ear in groups, also on the neck.

Nostril not tubular, lateral, just below the canthus rostralis, very close to hind margin of nasal.

Crests on the neck and back very distinct.

Ventral scales strongly keeled and mucronate.

Scales on limbs like the dorsals, strongly keeled and intermixed with enlarged ones.

Fingers: Third longest, first extending as far as the fifth.

Toes: Third longest, fifth extending well beyond first.

Anal pores in a single row.

Tail with scattered enlarged spinose scales at the base.

Colouration: Brown or olive, spotted with darker, lighter beneath; vertebral stripe absent.

Records:

1-2 Cape Colony, Godeffrey (*Plate XX*, figs. 1, 2, 3).

3-4 Stellenbosch, Dr. Breyer.

5-6 Lydenburg, Kranz.



Plate XVII.

Agama atricollis, Smith, male.



Plate XVIII.

Agama atricollis, Smith, female.



Plate XIX.

Agama aculeata, Merr.

1, Dorsal ; 2, Ventral.

Agama brachyura, Boulenger.

1, Dorsal ; 2, Ventral.

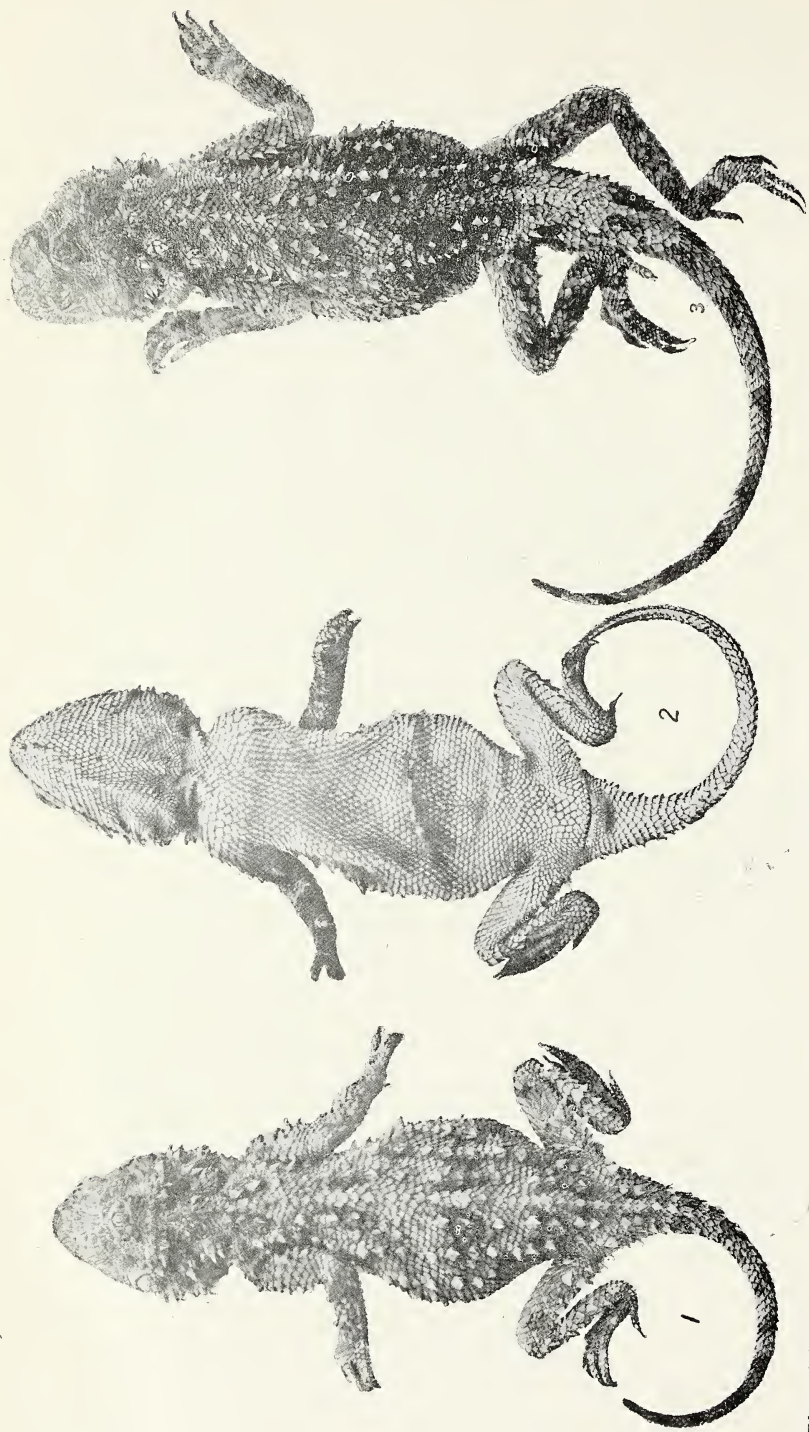


Plate XX.

Agama hispida (Linn.)

1. Female, dorsal ; 2. Female, ventral ; 3. Male.

7-8 Waterval Onder, Nov., 1907, Gough.

9 No record. Intermediate in characters between this species and *A. hispida* var. *distanti*. Vertebral line reduced to a few spots, ventrals strongly keeled.

AGAMA HISPIDA VAR. DISTANTI. BOULENGER.

Plate XXI, figs. 1, 2, 3.

Dorsal scales (smaller than in the preceding species, compare photographs), strongly keeled, imbricate, mucronate, intermixed with strongly enlarged spinose scales, arranged in longitudinal rows.

Head scales rough, keeled. Occipital enlarged, some sub-conical scales on the middle of the snout and on the back of the head, perhaps not quite so raised as in *A. hispida*.

Spines on the sides of the head near the ear and on the neck in small groups. On the upper surface of the head the spines are short, sub-conical, perhaps not quite so large as those of *A. hispida*.

Nostril, not tubular, just below the canthus rostralis.

Crests : A very distinct nuchal and dorsal crest.

Ventrals smooth or feebly keeled (sometimes strongly keeled!).

Scales on the limbs strongly keeled, larger than the dorsals, unequal.

Fingers : Fourth longest, first and fifth equally long.

Toes : Third longest, fifth not extending as far as the first.

Tail with strongly keeled mucronate scales, intermixed with enlarged spinose scales at the base.

Colouration very variable, a light, sometimes broken, vertebral stripe constantly present, dark brown or reddish brown above, spotted or barred with darker. A V-shaped light mark often present across the head above the eyes, another light bar across the snout just in front of the eyes, sides of belly and chest often brick red, belly yellowish. Throat usually with blue or black markings forming reticulations or longitudinal wavy lines.

Habits : *Agama hispida* var. *distanti*, Blgr., is very common in most parts of the Transvaal ; it frequents stony places, and may often be found along the sides of a road. When running it carries its belly well off the ground, and its tail in the air. It usually runs a short distance, then squats down suddenly, moving on again if disturbed. One frequently sees them raising and lowering their heads and the front part of the body rapidly for several times in succession. They often sit at the opening of an ant's nest and pick off each ant as it comes out. The female digs a hole two or three inches deep to lay its eggs in, and fills in the hole again, having deposited its eggs. I have also observed them climbing up shrubs to a height of a yard or more above the ground (especially near Woodbush). It is interesting to note that about 80 per cent. of the specimens found around Pretoria are infested with Cestodes.

Records :

1-20 Pretoria, 1907.

21 Transvaal.

22-23-24 Waterberg, May, 1899.

25 Pretoria, Sept., 1897, Gunning.

26-30 Pretoria, Aug., 1897.

31 Pretoria, 1906, Kirby.

- 32 Irene, Taylor.
- 35-36 Transvaal.
- 37. Pretoria (*Plate XXI*, figs. 1, 2).
- 38 Woodbush, 1907, Gough (*Plate XXI*, fig. 3).
- 39 Lydenburg, Kranz.
- 40 Brandfort, Orange River Colony, 1907, Haagner.
- 41 Pretoria, Breyer.
- 42 Pretoria, 1897, Durr.
- 43-45 Krabbefontein, Breyer.
- 46-47 Transvaal, Visée.
- 48 Pretoria, 1897.
- 49 Selati, Flygare.
- 50 Waterval Onder, 1907, Gough.
- 51 Woodbush, 1907, Gough.
- 52 Transvaal.

Remarks: *Agama distanti*, Blgr., was described in 1902 by Boulenger to include the small *Agama* which occurs in abundance about Pretoria, the chief, and most easily observed, differences from *A. hispida* being in colouration. Boulenger, however, points out that they differ from *A. hispida* also in structural characters, notably in the larger size of the ear-opening, and in the absence, or feeble development, of keels on the ventral scales of the Transvaal *Agama*. In calling *Agama distanti*, Blgr., a variety of *A. hispida*, I am led by the following considerations:—The ventral stripe is usually very distinct, but in the large number which has passed through my hands, of which only a small part have been recorded above, many specimens show the vertebral stripe broken up into spots, and sometimes only just indicated. The keels on the ventrals are as stated by Boulenger, very often wanting or weak; some specimens, however, agree perfectly in this respect with *A. hispida*. As to the relative size of the ear-opening, I have not been able to notice any difference in this respect between the specimens of the two species. Boulenger only remarks the larger size of the ear-opening in *A. distanti* than in *A. hispida*. For the latter species he states: Ear-opening small, not quite as large as the ear-opening. Summing it all up, while admitting a difference to exist, I find that it is chiefly a difference in colouration, and usually, but not always in the degree of development of the keels of the ventral scales. Under these circumstances I prefer to consider *A. distanti* only as a geographical variety of *A. hispida*.

10. AGAMA ARMATA. PETERS.

Dorsal scales moderately large, imbricate, strongly keeled, intermixed with enlarged scales, forming three or four longitudinal series.
 Upper head scales keeled, back of head with scattered short spines, occipital enlarged.
 Groups of strong spines on the sides of the head and neck.
 Nostrils tubular, lateral, pierced just below the canthus rostralis.
 Crests distinct on neck and back.
 Ventral scales strongly keeled and mucronate.
 Fingers: Third slightly longer than fourth.
 Toes: Third slightly longer than fourth, fifth extending beyond the first.
 Tail: Rounded, covered with strongly keeled scales.

Colouration : Olive brown above, the enlarged scales lighter, a double series of dark spots along the back ; lower surface lighter, the throat with darker longitudinal lines.

Remarks : The description is taken from Boulenger. Bocage (loc. cit., p. 128) remarks on some specimens which he refers with some reserve to this species. In these the ventral keels are more or less effaced, the fifth toe just extends beyond the first, and the first rows of enlarged scales are symmetrically arranged in curves. Bocage's specimens had only one row of anal pores, as compared to two in the type. Peters' description is inaccessible to me.

11. AGAMA PULCHELLA. *BOCAGE*.

Dorsal scales small, hexagonal, strongly carinated and mucronate, intermixed with enlarged scales arranged in longitudinal rows on the vertebral region, or scattered, isolated, or in small groups. A dorso-lateral fold gives insertion on each side to a row of spines.

Head scales partly smooth, partly tubercular, occipital enlarged.

Groups of prismatic scales on the sides of the head and neck, a few spines around the margin of the ear.

Nostril on the canthus rostralis.

Crests on the neck, back and on the anterior two-thirds of the tail distinct.

Ventral scales smaller than the dorsals, their keels more or less effaced.

Fingers : Fourth slightly longer than third.

Toes : Fourth longer than third, the fourth extends far beyond the first.

Scales around the body 130-140.

Scales on tail and upper surface of the limbs much larger than the dorsals.

Praeanal pores in a single row.

Colouration : Ground colour grey brown with irregular blackish markings, a light vertebral stripe extending on to the tail, some small grey spots on the back, under surfaces grey, with greyish black or greyish blue wide reticulations. The vertebral band is absent in the young.

Remarks : The types were collected at Modder River by Dr. Holub. The description is taken from Bocage (loc. cit., pp. 116-117). I have not yet found this species.

12. AGAMA ACULEATA. *MERR.*

Plate XIX, figs. 1 and 2.

Dorsal scales strongly imbricate, keeled often mucronate intermixed with strongly enlarged ones.

Upper head scales smooth or feebly keeled.

Groups of small spines on the sides of the back of the head, and on the neck.

Nostril tubular, on the canthus rostralis.

Crests distinct on neck and back.

Ventrals imbricate, smooth.

Fingers : Third longest, fifth extending beyond the first.

Toes : Third longest, fifth extending as far as the first.

Tail rounded, caudal scales larger than dorsals.

Scales on upper surface of the limbs unequal. A single row of anal pores.

Colouration : Olive brown above with a double series of large dark spots. (A light vertebral stripe extending on to the tail sometimes present.)

Under surface grey, throat with dark blue reticulations.

Records : I, Bandolier Kop, Zoutpansberg, 1906, Gough (*Plate XIX*, figs. 3, 4).

13. AGAMA ATRA. DAUD.

Plates XXII, XXIII, XXIV.

Dorsal scales imbricate, strongly keeled and mucronate, largest on vertebral line, intermixed with scattered, somewhat enlarged, scales.

Head covered with smooth, sometimes convex, scales.

Groups of short spines on the sides of the head, near the ear, and on the neck.

Nostrils tubular, directed upwards and backwards, on the canthus rostralis.

Crest distinct on neck (and on the tail in adult males).

Ventrals smooth, imbricate.

Rows around body 120-180.

Fingers : Fourth slightly longest, fifth projecting beyond first.

Toes : Third and fourth sub-equal, or fourth slightly longest, fifth extending well beyond first.

Tail rounded in young and in female, strongly compressed in male, caudal scales much larger than dorsals, strongly keeled and mucronate.

Anal pores in a single row.

Scales on the upper surface of the limbs larger than the dorsals.

Colouration very variable. In my specimens a light vertebral stripe is usually present. Adults from Woodbush are grey above, marbled with darker, sometimes with a row of large dark blotches on each side of the vertebral line, edges of belly brick red, under surfaces grey, diffused with blue, under surface of throat reticulated with blue. Other specimens are dark olive brown above, with a yellow vertebral stripe and a few small yellow spots above, under surfaces yellow, throat and chest bluish, young often brown, widely reticulated with orange, grey beneath.

Remarks : *Agama atra* is a species with a very wide range of variation, as is proved by the creation of the synonymic species *A. micropholis* and *A. microterolepis* by Matschie and Boulenger. The specimens at my disposal can be divided into several groups according to colouration.

Records :

A. Light greyish specimens (as described from Woodbush).

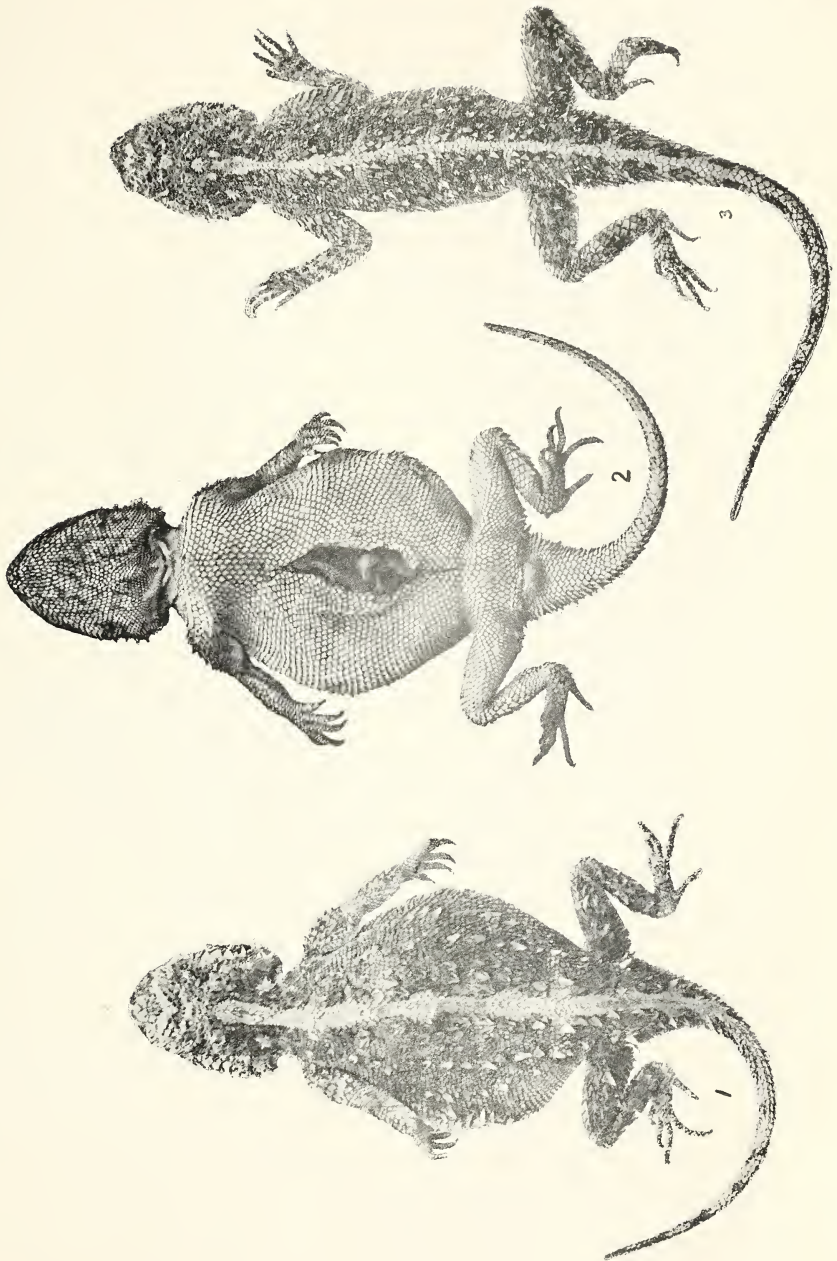
1-4 (Adults) Woodbush, Zoutpansberg XII, 1907, Gough (*Plate XXII*).

5 (Half-grown male, tail not compressed), Heidelberg, Tvl., XII, 1906, Howard (*Plate XXIV*, fig. 3).

B. Dark brown specimens, with orange vertebral stripe and small orange spots, under surfaces bluish anteriorly, dirty yellow posteriorly.

6 (Adult male) Transvaal, 1906, Coll. Ross.

7 (Adult male) Hanover, C.C., Taylor (tail strongly compressed).



Agama hispida, var. cf. instanti, Boulenger.
1. Female, dorsal ; 2. Female, ventral ; 3. Male.



Plate XXII.

Agama atra, Dand., male.



Plate XXIII.

Agama atra, Dand., female.



- C.* Brown, with wide orange reticulations and small white spots above, lighter beneath (brownish or whitish), sometimes reticulated with bluish on throat.
8-10 (Young) Dedeur, Evaton, 1907, Kolkenbek (*Plate XXIV*, fig. 2).
11-12 (Adult females) Frederikstad, 1907, J. J. Cable (*Plate XXIII*).
13-15 (Young), no locality, 1906, Coll. Ross.
16 Half-grown, Dedeur, Evaton, Oct., 1907, Kolkenbek.
- D.* as *C.*, but without reticulations, some lighter markings.
17-19 (Young) Grahamstown.
19-21 (Adult male and half-grown females) Hannover, C.C., Taylor.
- E.* Blackish above and below, tail brown above, yellow below.
22 Adult male, Hannover, C.C., Taylor.
- F.* (Female) differs considerably in habitus from all other specimens. Scales on back of head mostly keeled, some conical. Enlarged scales on back much larger than normal. Scales on limbs very unequal. Spines on side of head larger than usual, ear-opening small. Ventral scales very weakly keeled. Above brown, a light vertebral stripe, enlarged scales lighter, below yellowish, throat and chest reticulated with blue.
23 Adult female, Transvaal (*Plate XXIV*, fig. 1).

Note.—Some specimens I kept alive could change their colours to bright blue in a manner similar to *A. atricollis*.

14. AGAMA HOLUBI. *BOCAGE*.

- Dorsal scales, smooth or feebly keeled, surmounted by a small spine, intermixed with scattered enlarged spinose scales.
Head covered by smooth, flat scales, and conical pointed scales, occipital enlarged.
Groups of short spines around the margin of the ear, on the sides of the head, and on the neck.
Nostril, on the canthus rostralis.
Crests, only on the neck.
Ventrals, smooth quadrangular, sub-equal in size to the dorsals.
Rows around the body, 170-180.
Fingers: Third slightly shorter than fourth.
Toes: Third and fourth sub-equal, fifth extending beyond the very short first.
Tail longer than head and body, caudal scales much larger than the dorsals, strongly keeled and mucronate.
Limbs covered with strongly keeled, mucronate scales, larger than the dorsals.
Colouration: Grey above with small irregular brown spots and white dots. Tail and limbs with equally spaced brown transverse markings.
Remarks: The description is taken from Bocage (loc. cit., p. 116). The type specimen was collected by Dr. Holub at Modder River (O.R.C.) Evidently very closely related to *A. alra*, if not identical.

A G A M A.

KEY TO THE SPECIES OCCURRING IN SOUTH AFRICA.

- | | | | | | | |
|--|-----|-----|-----|-----|----|---|
| 1. Dorsal scales equal | ... | ... | ... | ... | 2 | |
| Dorsal scales unequal, i.e. mixed with scattered enlarged scales | ... | ... | ... | ... | 6 | |
| 2. No dorsal crest | ... | ... | ... | ... | 3 | |
| A dorsal crest | ... | ... | ... | ... | 5 | |
| 3. Dorsal scales smooth, not mucronate | ... | ... | ... | ... | | <i>Agama planiceps</i> (p. 184). |
| Dorsal scales keeled | ... | ... | ... | ... | 4 | |
| 4. 120-160 scales around the middle of the body | ... | ... | ... | ... | | <i>Agama atra</i> (p. 192). |
| 60-80 scales around the middle of the body, an enlarged scale on the snout | ... | ... | ... | ... | | <i>Agama colonorum</i> (p. 184). |
| 5. Ventrals smooth | ... | ... | ... | ... | | <i>Agama kirki</i> (p. 185). |
| Ventrals keeled | ... | ... | ... | ... | | <i>Agama mossambica</i> (p. 185). |
| 6. Occipital enlarged, or males with a single row of preacanal pores... | ... | ... | ... | ... | 7 | |
| Occipital not enlarged, males with a double row of preacanal pores... | ... | ... | ... | ... | | <i>Agama atricollis</i> (p. 186). |
| 7. Fifth toe not extending as far as the first | ... | ... | ... | ... | 8 | |
| Fifth toe extending as far as or beyond the first | ... | ... | ... | ... | 11 | |
| 8. No spines on the anterior or inferior border of the ear | ... | ... | ... | ... | | <i>Agama anchietai</i> (p. 187). |
| Spines on the anterior and inferior border of the ear | ... | ... | ... | ... | 9 | |
| 9. Third and fourth toes sub-equal | ... | ... | ... | ... | | <i>Agama brachyura</i> (p. 188). |
| Third toe distinctly longest | ... | ... | ... | ... | 10 | |
| 10. No vertebral stripe, ventrals strongly keeled | ... | ... | ... | ... | | <i>Agama hispida</i> (p. 188). |
| A vertebral stripe, ventrals usually weakly keeled or smooth | ... | ... | ... | ... | | <i>Agama hispida, var. distanti</i> (p. 189). |
| 11. Ventral scales keeled | ... | ... | ... | ... | 12 | |
| Ventral scales smooth | ... | ... | ... | ... | 13 | |
| 12. Nostril pierced just below the canthus rostralis, back of head with scattered short spines, ventrals strongly keeled and mucronate | ... | ... | ... | ... | | <i>Agama armata</i> (p. 190). |
| Nostril pierced on the canthus rostralis, back of head with groups of prismatic enlarged spines, ventral keels more or less effaced | ... | ... | ... | ... | | <i>Agama pulchella</i> (p. 191). |
| 13. A feeble but distinct dorsal and nuchal crest | ... | ... | ... | ... | | <i>Agama aculeata</i> (p. 191). |
| No dorsal crest (nuchal crest present) | ... | ... | ... | ... | 14 | |
| 14. Upper head scales smooth or feebly keeled | ... | ... | ... | ... | | <i>Agama atra</i> (p. 192). |
| Upper head scales smooth and flat, intermixed with pointed conical scales | ... | ... | ... | ... | | <i>Agama holubi</i> (p. 193). |